Volunteer Lake Assessment Program Individual Lake Reports

CRYSTAL LAKE, MANCHESTER, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	200	**Max. Depth (m):**	6.4	**Flushing Rate (yr^{-1})**	1.8
Surface Area (Ac.):	19	**Mean Depth (m):**	2.9	**P Retention Coef:**	0.66
Shore Length (m):	1,100	**Volume (m^3):**	217,000	**Elevation (ft):**	206

TROPHIC CLASSIFICATION

Year	Trophic class
1981	EUTROPHIC
1997	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

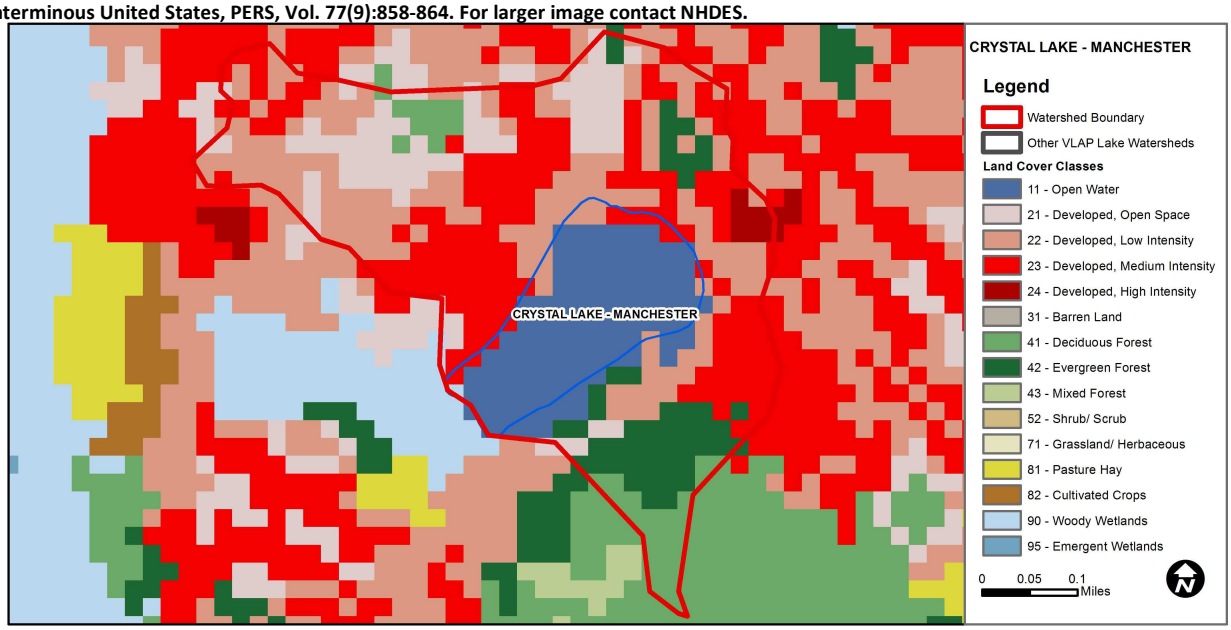
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	<5 samples and median is > threshold. More data needed.
	pH	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.
	D.O. (mg/L)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (% sat)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Encouraging	>2 samples exist that are > 75% of geometric mean criteria, but not enough samples to calculate geomertic mean. No single sample exceedances. More data needed.
	Chlorophyll-a	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

CRYSTAL LAKE - MELODY PINES DAY CAMP BEACH	E. coli	Cautionary	One exceedance of single sample criteria but not enough data to calcuate geometric mean. More data needed.
CRYSTAL LAKE-TOWN BEACH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.

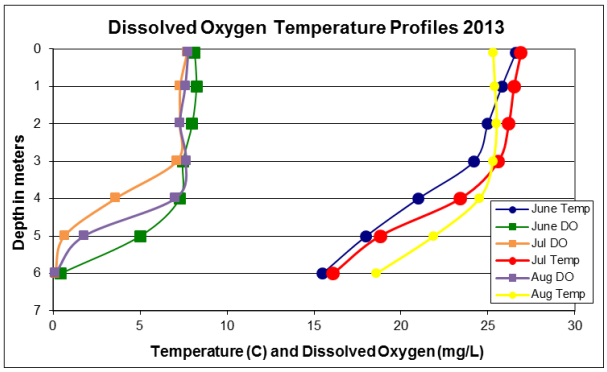


Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	18.4	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	12.1	Deciduous Forest	5.74	Pasture Hay	0
Developed-Low Intensity	26.8	Evergreen Forest	9.18	Cultivated Crops	0
Developed-Medium Intensity	26.8	Mixed Forest	0	Woody Wetlands	0.19
Developed-High Intensity	0.96	Shrub-Scrub	0	Emergent Wetlands	0

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
CRYSTAL LAKE, MANCHESTER, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels were relatively low, less than the state median, and stable throughout the summer. Historical trend analysis indicates relatively stable chlorophyll with moderate variability between years.
- **CONDUCTIVITY/CHLORIDE:** Conductivity levels were elevated and indicative of an urbanized watershed. Chloride levels were greater than the state median however much less than the chronic chloride standard. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity since monitoring began.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus was slightly elevated and greater than the state median. Historical trend analysis indicates significantly increasing (worsening) epilimnetic phosphorus since monitoring began. Metalimnetic and Hypolimnetic phosphorus were also slightly elevated, but within a normal range for those stations.
- **TRANSPARENCY:** Transparency was within a normal range, stable throughout the summer, and slightly better than the state median. Historical trend analysis indicates stable transparency with low variability between years.
- **TURBIDITY:** Epilimnetic turbidity was slightly elevated in August, otherwise deep spot turbidity levels were generally low.
- **PH:** pH levels were sufficient to support aquatic life. However, historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH since monitoring began.
- **RECOMMENDED ACTIONS:** Epilimnetic phosphorus levels have increased. The increased frequency and intensity of significant storm events highlights the need to reduce and manage stormwater runoff to the lake. Educate lake and watershed residents on ways to reduce stormwater runoff from their properties utilizing DES' "Homeowner's Guide to Stormwater Management". The increasing conductivity may be improved by educating residents on proper use and clean-up of winter de-icing materials. Keep up the great work!



NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Table 1. 2013 Average Water Quality Data for CRYSTAL LAKE

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m NVS	Trans. m VS	Turb. ntu	pH
Epilimnion	18.7	3.77	22	385.7	14	3.67	3.67	1.18	7.08
Metalimnion				388.3	13			1.01	7.03
Hypolimnion				393.0	15			1.04	6.77

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Degrading	Data significantly decreasing.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
Conductivity	Degrading	Data significantly increasing.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Degrading	Data significantly increasing.